Next Week: What to Make for July 4th

POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

TELLS YOU HOW TO DO THINGS. WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 1. No. 24. CHICAGO, JUNE 21, 1902. PRICE 5 CENTS.

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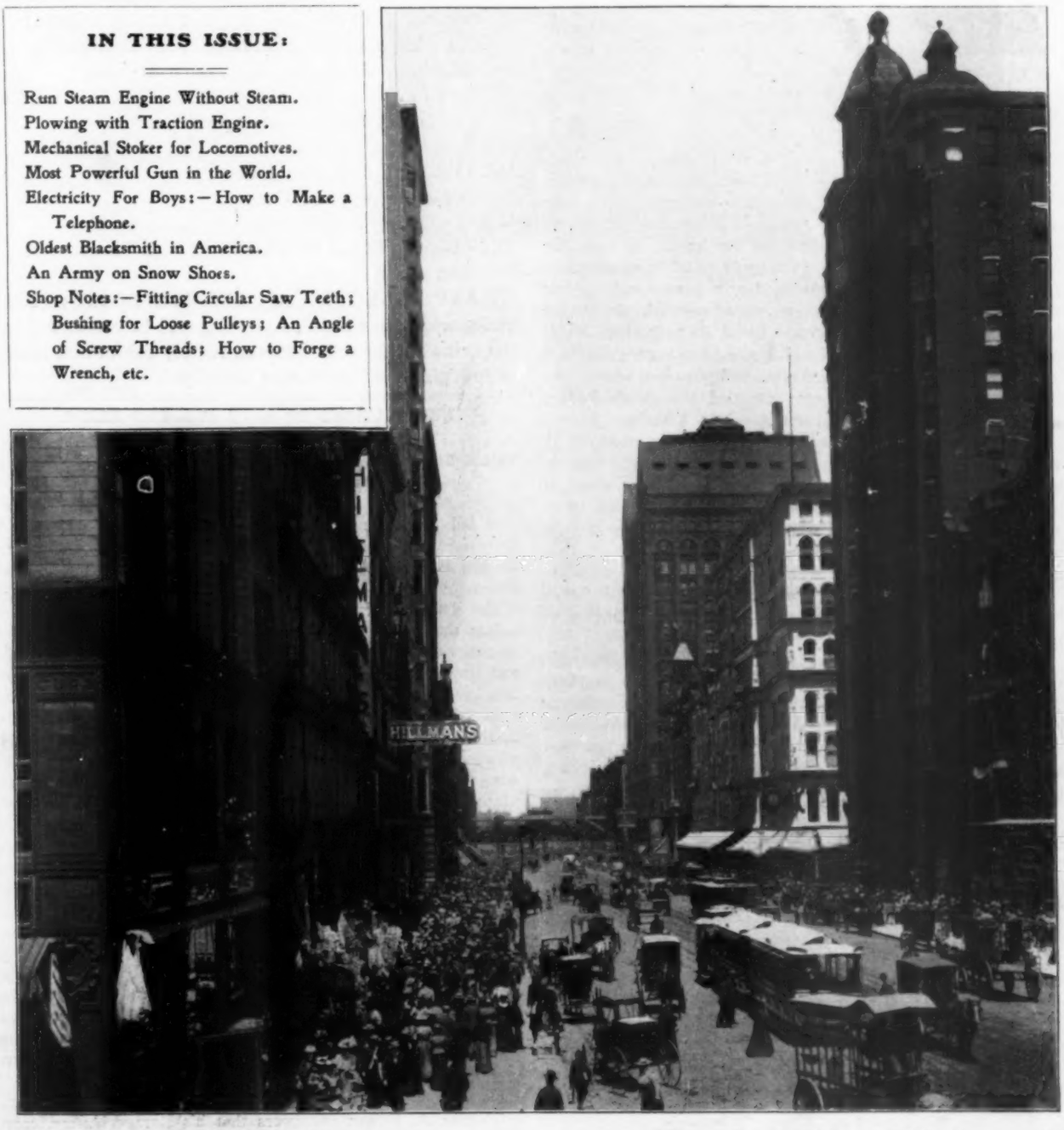
Shop Notes:—Fitting Circular Saw Teeth; Bushing for Loose Pulleys; An Angle of Screw Threads; How to Forge a Wrench, etc.



Great Steel Structures on State St., Chicago

FOR SALE BY ALL NEWSDEALERS.

LIBRARY OF CONGRESS JUN 20 1902 SMITHSONIAN DEPOSIT

DANGER OF SKY SCRAPERS ON RETAIL STREETS.

Earthquakes or Corrosion of Steel Frames Might Cause Wholesale Loss of Life.

Should sky-scrapers be permitted on the retail streets of a city? This is a question that is inducing considerable argument since the recent seismic disturbances and the declaration of W. S. Smith, the well known Chicago engineer, that the beams and girders of the steel frames are quickly impaired by corrosion. According to Mr. Smith's statement the sky-scrapers are in danger of collapsing in a few years because of the weakening of the structures which form their foundation.

A catastrophe more terrible than the collapsing of one of these monster structures on a crowded street could scarcely be imagined. It would not take much of an upheaval of the earth to completely overbalance many of them, so tall and narrow are they built.

In the front page illustration we show a view of State street, the heart of the retail district of Chicago. Many claim it to be the most crowded thoroughfare in the world. Only a few of the sky-scrapers on this street can be shown in one picture. While there are fewer sky-scrapers on State street than on any other in the heart of the city, the danger here is greater because of the street's crowded condition. Chicago recently passed an ordinance removing the limit on the height of buildings. Many claim that this law should not apply on State street, which from morning until night is thronged with women and children shoppers. Tall department stores, many contend, should not be permitted under any conditions; for in these the loss of life would be appalling in the event of any accident during the busy hours. Six stories is considered a tall building on a retail street in Europe and conservative men say that this should be the limit to the height of department stores in America. Such a building would be about the height of Hillman's, a store that is very popular among Chicago mechanical workers, the sign of which is plainly discernible in the front page illustration. If all the buildings were of this height, it is claimed, the street would have a more artistic appearance and there would be a chance for all the people to get out in case of fire or other accident.

We print below an extract from the speech of W. S. Smith before the Chicago real estate board, telling of the dangers of corrosion:

"Wherever sulphurous fumes come in contact with iron and steel very rapid corrosion takes place—so rapid that in instances where locomotives run frequently under a steel structure the fumes escaping from the smokestack have injured iron beams and girders to such an extent that they were unsafe in less than five years. A notable example of that kind was in the approach to the Eads bridge in St. Louis. I presume similar instances could be found in Chicago if a little care was taken to look them up.

"Any attempt to cover steel with perishable paints to prevent corrosion are worse than useless. Common oil paint will lose its efficacy within five years; in the meantime keeping the concrete from contact with the steel and so robbing the steel of the protection the lime in concrete would give."

Emperor William in a recent speech declared that in the next European war 4,000 men with machine guns would be able to repel an army of 80,000.

40 Things for July 4th
How to Do Them
See POPULAR MECHANICS
for June 28

SUMMER COURSE IN MECHANICS FOR BOYS.

The publisher of Popular Mechanics announces a Summer Course in mechanics, for Boys. This will include an illustrated series of articles on How to Make Things in Wood and Iron, "written so you can understand it," and illustrated so you can do it. Selection has been made of such articles as are not too difficult, and which can be built at least possible expense for materials and tools. This course will begin with the issue of June 28th, and be continued each week until September. The opening chapters are as follows:

I. Selecting Tools and Making Work Bench.
II. Making a Small Box for Toilet Articles.
III. and IV. Building a Row Boat: This boat will be 14 ft. long and seat four persons.
V. Building a Book Case.
VI. Building a Pigeon House.
VII. Making a Cozy Corner.
VIII. Making Box to Contain Shoes, etc.
IX. Making Stand on which to Polish Shoes.
Etc. etc.

EASY ELECTRICAL EXPERIMENTS: This series which has been so popular will be continued by the same author and many extremely useful and interesting pieces of apparatus described.

NEGOTIATIONS TO SAVE ALASKAN SEALS.

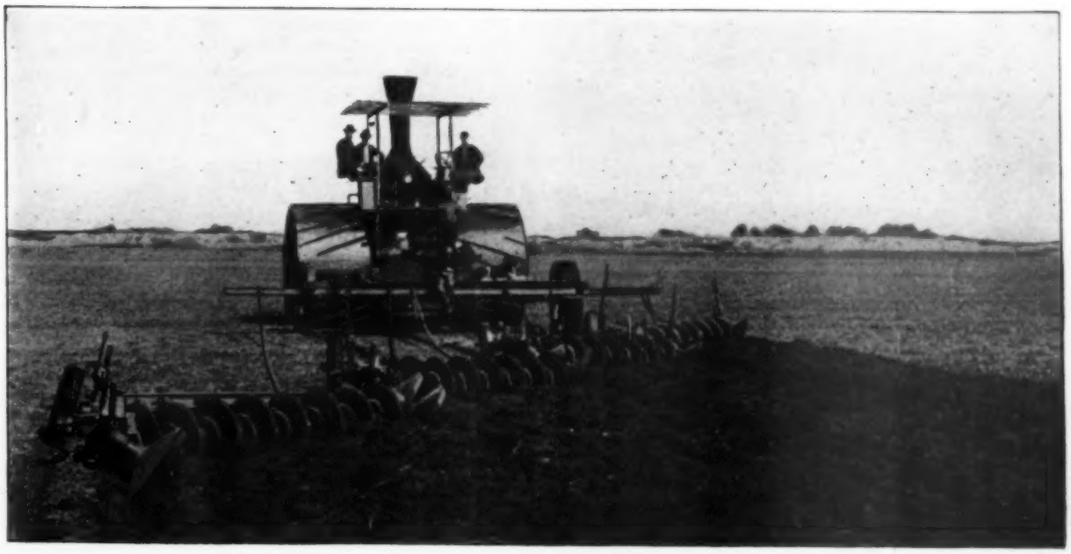
United States Tires of Breeding and Protecting Fur-Bearing Animals for Other Nations to Kill.

A bill authorizing the president to negotiate with Great Britain in an effort to prevent the extermination of the fur-bearing seals of Alaska, has been favorably reported by the House Ways and Means Committee. The bill provides that if the slaughter of the seals by British subjects is not stopped before the opening of the pelagic sealing season of 1902 the secretary of the treasury shall be authorized to kill all male and female seals found on the Pribiloff Islands with the exception of 10,000 female seals and 1,000 male seals and the proceeds of the skins shall go to the United States treasury. It is declared that all previous negotiations and agreements have utterly failed to preserve the seals and prevent their killing. Also that the United States is reduced by reason of the failure of these negotiations to the painful position of being obliged to breed and protect annually some 15,000 female seals on the islands of Alaska for alien hunters to slaughter at sea, while the people of the United States are absolutely prevented from killing them by special act of Congress, and further, that by reason of the killing of from 20,000 to 30,000 mother seals every year by alien hunters, thousands of pup seals are starved to death every season.

This ruin of the sealing industry of the United States in Alaska waters, it states, compels the government to support the native inhabitants of the sealing islands by annual appropriations from the treasury and to keep a staff of treasury agents on the islands and maintain an idle patrolling service of revenue marine cutters.

Thomas A. Edison announces that his storage battery, combining greater power with lighter weight, is a success. As a result he himself asserts: "We may now say good by to the horse for commercial purposes."

Plowing with Traction Engine



Plowing 28 Feet Wide on California Ranch.

Each year there is some new invention or improvement on old machinery which tends to relieve the farmer of hand labor and perform the same work quicker, easier and much cheaper by machinery. The farmer has had nearly all the hardships of his work of 20 years ago made easy by inventive genius.

In England and Germany for several years experiments have been made of drawing a gang of plows across a field by means of a wire cable which was wound on a drum by means of a portable engine. While this plan met with some degree of success it has never been generally adopted, even on such advanced farms as the Dalrymple in North Dakota.

In our illustration is shown a successful steam plowing scene. A powerful traction engine is drawing a Spalding-Robbins disc plow turning 28 furrows each one foot wide. The photograph was taken on a ranch near Stockton, Cal. The disc plow is a comparatively recent invention. Each disc is set to the desired angle and revolves on its own separate axle. A small furrow-wheel which runs in the bottom of the furrow is set at an angle to each disc. The plowman regulates the depth by two levers.

The first patent for a plow in this country was taken out in 1797. It was the first cast-iron plow ever made, but the farmers in those days entertained great prejudices against it. There was a general idea throughout the country that a cast-iron plow would "poison" the land. It required from 1797 to 1842 for the inventive genius of the country to arrive at any just conclusions as to what would be the best form of plow.

The chilled plow first appeared in 1870. This was a light, durable plow with a mold-board of proper shape to economize draft and suitably turn the furrows, and this plow in a marked degree promoted economical plowing. It was stated in 1878, by good authority, that this invention, if used throughout the United States in the previous year, would have effected a saving of $45,000,000 to the farmers of the country in the expense of plowing.

There was no radical departure from the primitive plow of the ancients. The plow, though made of iron, and called by every conceivable name, was still the same old "crooked stick."

The nineteenth century brought forth machines that multiplied many fold the producing power of human labor. In the west one man can now raise as much wheat in a season as will feed twelve hundred persons for a year. The up-to-date reaper cuts and binds grain at a rate of forty-five minutes per acre. Another machine threshes, winnows and bags the products at the rate of sixty acres per day. One establishment now turns out a hundred and ninety thousand mowers, reapers and harvesters annually, or one machine in less than a minute for every working day of the year.

ELECTROLYSIS CAUSES GREAT PUBLIC LOSS.

Suits against the street railway companies are to be instituted by the City of Chicago, it is said, to recover damages alleged to have been sustained to water pipes and other city property by electrolysis. Estimates place this loss, caused by uncontrolled electric currents from street and elevated railways, at $1,500,000 annually. The subtle force escapes from the rails and enters water pipes and at the point of departure eats a portion of the pipes away, leaving jagged holes through which many thousands of dollars worth of water goes to waste, to say nothing of the damage to pipes and the cost of repairing. Small service pipes are practically eaten away, it is claimed, and big pipes a yard in diameter are pierced. City Engineer Ericson says that through these apertures there rushes a daily stream of 30,000,000 gallons of water.

THE GERMANS ARE ON OUR TRAIL.

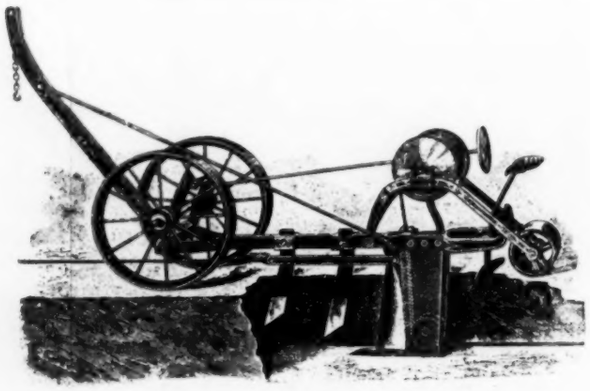
The American Consul at Berlin reports:

The Germans have made wonderful strides and are steadily improving the quality of their goods, especially tools. There is no use trying to do business any more on staple articles, like hay and manure forks, saws, drill, etc. Such commodities of hardware are made here, if not as good, just as serviceable and at much lower prices, so that German goods in these classes rule the European market. Meat choppers, vegetable slicers, coffee mills, and other household machinery are made here just as good as in the United States, and cheaper. First these articles were imported and imitated, then they were improved upon, and now they are furnished much handsomer and better than the original articles were. So the only chance for business is in practicable novelties.

INGENIOUS PLOW FOR LAYING CABLES.

Turns the Earth, Lays the Cable, Covers it Up and Packs Down the Dirt as it Moves Along.

A remarkable machine which plows a trench and lays a cable as it proceeds has been built by the French Wireless Telegraph and Telephone company. It is to be used for laying the subterranean cable across the Sahara desert between Gabes and Lake Tchad. That this cable-laying plow should have been



This Plow Lays Cables.

built by a wireless telegraph company is the subject of much amusement among Parisian mechanics.

The plow will bury an armored cable three feet below the surface of the ground without the necessity of first digging a trench. It is to be pulled either by cable attached to a winding engine or by a number of horses. Not only does it dig the trench and lay the cable as it is pulled along but also covers up the cable and packs down the dirt on top of it without going over the route but once. The ground is first opened by a coulter blade of great strength. This is followed by another similar blade of wider shape. Then comes the hollow plow share. The cable is unwound from the coil on the frame above and runs beneath a pulley in the plow share, indicated by the dotted lines, thus being laid in the bottom of the trench. The earth is turned back into the trench by a mould board to the rear and then follows a roller which packs the dirt down on the cable almost as smoothly as it was before the plow passed.

TO INVESTIGATE SALE OF HORSE MEAT.

Charges That It Is Served in Saloons and Restaurants of Chicago for Beef.

Chicago is to investigate the charges that horse meat is sold in the city and served in many of the restaurants for beef steak. The city would not be so indignant if fat and healthful horses were slaughtered for the market but the accusation is made that the meat is in many cases from animals that are worn out and diseased. One instance is related of a horse at the slaughtering house that had fallen dead. The chief instigator of the sensational charges is Assistant State Pure Food Commissioner Patterson. He exhibited to the council committee on health a big photograph of a series of sheds near Milwaukee and Tolman avenue, the foreground of which showed a painted sign:

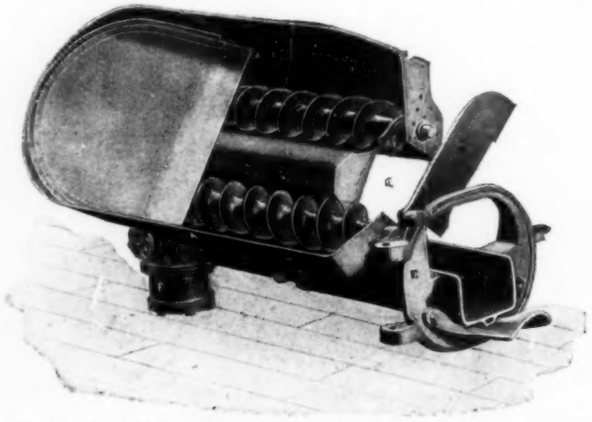
"Horses bought, sold and exchanged. Killers wanted."

Mr. Patterson said: "An average of 500 horses are killed in Chicago every month. I can show you a saloon where you can get horse corned beef any time. I know that it has been going on for years and that horse meat is sold and eaten at lunch counters."

MECHANICAL STOKER FOR LOCOMOTIVES.

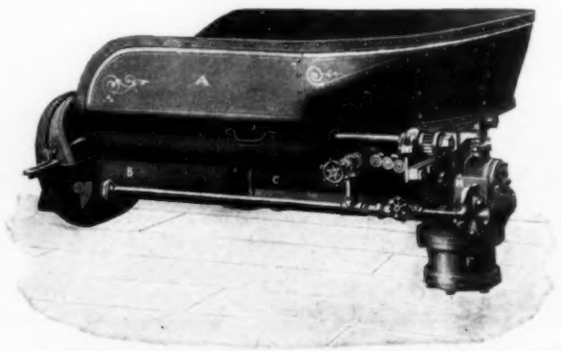
If the mechanical stoker invented by John W. Kincaid, a former railroad engineer, comes into general use, the locomotive fireman will have an easy time. Already he has a small steam engine attached to the bell which is put in action by simply pulling the rope, and which continues ringing until he pulls on the rope again and stops it.

The stoker is fastened to the fire door, and consists of a hopper



Top View Showing Conveying Screws and Auxiliary Fire Door.

into which the coal is shoveled, and two revolving screws which push the coal into the fire. The screws are driven fast or slow, as the fireman desires, by a small steam engine which is made a part of the machine. The machine will throw 10 pounds at each stroke and can make 28 strokes a minute. If run at this speed it would deliver 16,800 pounds of coal an hour which is more than any engine now built could burn. A hand door enables an inspection of the fire box at any time. The machine avoids the draught of cold air which enters the fire box when-



Stoker in Working Position from Left to Rear.

ever the door is open, furnishes an even feed of fuel and is said to greatly reduce the amount of smoke now made. It also saves the fireman from the intense heat which pours out when the door is opened. A full description appears in the Railway Master Mechanic for June.

THE MAGNATES.

Buyin' up the railroads—
They've got 'em safe an' sound;
An' if they do not own the earth,
They cover half the ground.
—Atlanta Constitution.

The steamer Camano, with a crew of eleven men and a cargo of flour on board was caught in the rapids of the Columbia river and turned completely over. It finally grounded in shallow water. Archie Dovell, one of the crew, was the only man killed. The others escaped in a light raft.

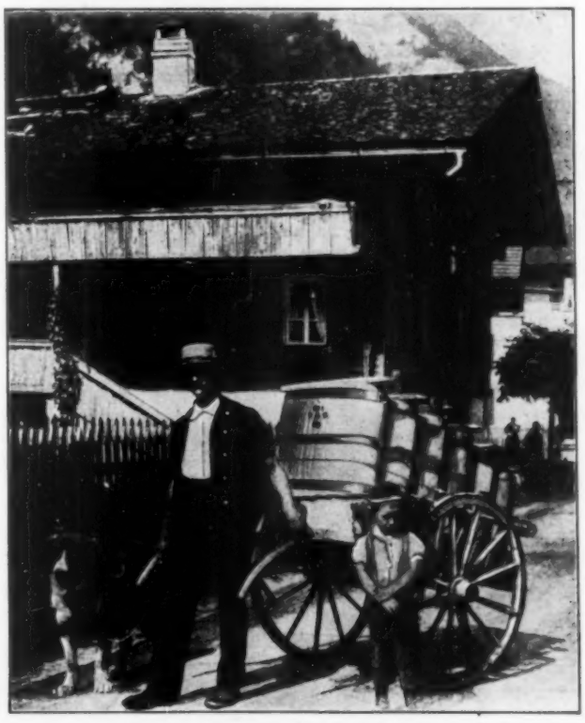
LIFE AND AIR ON THE MOON.

Scientific World Astounded By the Alleged Discoveries of Prof. Pickering of Harvard.

There is life, moisture and atmosphere on the moon, declares Prof. W. H. Pickering, of Harvard, one of the best known American astronomers. This assertion he makes in defiance of all past accepted theories, text books, and alleged scientific facts. His statement has set the scientific world agog, as the teachings of ages are thereby repudiated. Great volcanos have recently broke out in violent eruption on the moon and this fact has given the astronomer grounds for his sensational declaration. After a careful mapping of the details presented by the lunar crater Plato, the professor concludes that this portion of the moon's surface is subject to frequent and continual changes and that it is in a state of volcanic activity "more active than any area of similar size on the surface of the earth." The professor finds something analogous to snow or clouds, caused by the escape of steam and carbonic acid from these volcanic craters. The so-called variable spots on the surface of the moon, he attributes to vegetation. These markings are darkest just after full moon when the sun is in the lunar zenith and are invisible when the sun is lowest. Hence they cannot be due to shadows. Photographs of Jupiter, taken at Arequipa, just before and just after occultation by the moon, apparently show a slight flattening of the disk, also an indication of twilight and a lunar atmosphere. From the figures given by Prof. Pickering this observation would give an atmosphere equal to that of the earth at an altitude of 45 miles. While the professor claims that there is water on the moon he denies that the so called "seas" ever contained that element. He has found evidence of lakes and rivers on the moon's surface which he claims had their origin from hot springs and geysers formed by volcanic activity.

SWITZERLAND'S DAIRY PRODUCTS.

The making of butter and cheese forms one of the principal industries of Switzerland. At the Paris exposition, however, the Switzerland butter and milk exhibit was disappointing. The United States had the most notable display of any foreign country and was most liberally awarded, receiving a total of 124 prizes, including 6 grand prizes and 38 gold medals. The only country with which the American butter exhibit could be compared was France. No other country except France attempted to show natural milk and cream and to maintain a continuous exhibit of fresh dairy products. This was made possible by having a large display refrigerator, which was one of the most prominent features of the American agricultural section, and by the United States department of agriculture which furnished constant supplies of fresh products.



From the Hamlet—Carrying Milk to the Cheese Factory in Switzerland. From Report of Henry C. Alvord, U. S. Dept. of Agriculture.

From the Mountains—Carrying Milk to the Cheese Factory in Switzerland. From Report of Henry C. Alvord, U. S. Dept. of Agriculture.

Switzerland's highest award for butter was one gold medal, which went to the instructor and butter maker at the Federal Dairy school at Rutti-Zollikoffen. The Switzerland cheese exhibit, however, was one the greatest at the exposition. The principal varieties made in Switzerland are Emmenthal, Gruyere, Sbrinz, Tilsit and Sapsago.

MOST POWERFUL GUN IN THE WORLD.

The United States 16-inch breech loading rifle of the United States army is the most powerful gun ever constructed. It was made at the Army Arsenal, Watervliet, N. Y. It weighs 130 tons, is 49 feet 2.9 inches long and has a breech diameter of 60 inches. The length of the bore is 37 feet 4 inches and the diameter of the bore is 16 inches. When fired with 1,000 pounds of brown prismatic powder it will throw a solid steel projectile weighing 2,370 pounds a distance of 24 miles when the gun is given an elevation of 45 degrees, and the muzzle velocity of the shot is 2,600 feet seconds. Should the gun have a carriage constructed so as to withstand the terrific recoil it is proposed to construct some 40 more similar for defensive purposes in the largest harbors of the United States.

Easy Electrical Experiments
FOR BOYS

By L. P. Dickinson

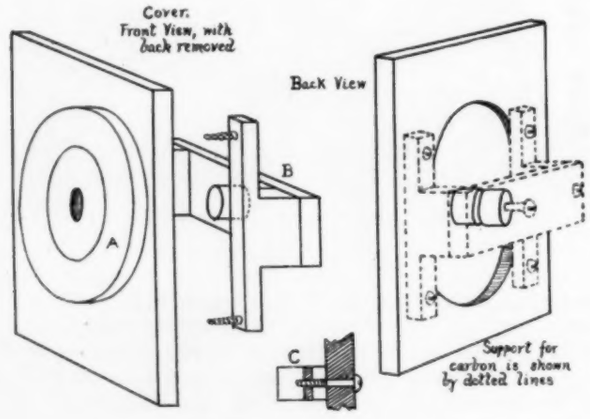
CHAPTER XXIV.

HOW TO MAKE A SET OF TELEPHONE INSTRUMENTS.

In Chapter XI a simple telephone was described, designed to be used over a short line. As there described the instrument was designed to be used both as a receiver and as a transmitter. That is, a person using the instrument would talk into and listen to the instrument alternately, no battery being required for its operation. Such an instrument is, however, unsuited for lines of much length, and the purpose of this and the following chapters is to describe an instrument capable of use over a line one mile in length, or even greater distances.

There are three essential parts to every telephone, viz.—a transmitter, a receiver and some form of signalling apparatus for calling. These will be described in the order named.

To make the transmitter, make a wooden box whose length is 4¾ inches, whose width is 3¼ inches and whose depth is



1½ inches, measurements being taken inside the box. This should be made of ⅜ inch whitewood, and one side, the cover, should be fastened on with screws.

In the middle of the cover of this box cut a circular hole 2¾ inches in diameter. Cut out also from a separate piece of whitewood, a circular piece 3¼ inches in diameter, with a ⅝ inch hole in its center. This is shown at A in the figure. On one side the hole is cut away so as to form a mouthpiece as shown in the figure.

This piece is to be screwed to the front of the cover, exactly fitting over the hole cut in the cover. There is ¼ inch margin left all around the hole, and this will be sufficient to hold the screws, if care be exercised. Before screwing it on, however, cut out of a piece of very thin ferrotype iron, a circular piece 3¼ inches in diameter. Bore a small hole through its center, and bore holes near the edges so that the screws holding the circular piece A to the cover, can pass through the iron. Cut out also from a piece of very heavy cardboard, a ring, whose outside diameter is 3¼ inches, and whose inside diameter is 2¾ inches. Now place the circular piece of iron over the hole in the cover, place the pasteboard ring on top of it, next place the circular piece of wood on top of the ring, and clamp the whole firmly to the cover by four screws. The iron is to be the diaphragm of the transmitter. The pasteboard ring is to keep the circular board from touching the iron, so that the latter is held only at its edges.

Make next a wooden frame shown at B. It consists of three pieces. Two of these, the side pieces, are each 2⅝ inches in extreme length, ⅞ of an inch in height, and 1 inch wide at the center. The other piece connecting these two is 1 inch wide, 3 inches long and ¼ inch thick.

Take a piece of carbon rod, such as is used in electric lamps, and cut out two pieces each ⅝ inch long and ½ inch in diameter. Bore half way through each piece lengthwise a very small hole, using a rotating drill for the purpose. If the carbon is held tightly in a vise, and if the boring is done very slowly, using a light pressure, the carbon need not be split in the process. At right angles to this bore another hole passing from one side to the other. In this drive a wooden plug. A section of the carbon is shown at C. Fasten one of these pieces of carbon to the center of the wooden frame B, by a screw passing through the wooden strip and into the hole in the carbon. Fasten the other piece of carbon to the back of the diaphragm in a similar manner.

When the wooden frame B is screwed to the back of the cover of the box, these two pieces of carbon should lie exactly in line, and there should be a clear space of about ⅛ inch between them. Adjust them by filing until this condition is secured.

In fastening the pieces of carbon in place, insert a piece of fine copper wire (about No. 30) under the end of each piece next to the screw, so as to make contact with the carbon. These wires should be about 6 inches long.

The little space between the carbon pieces is to be filled with very finely powdered carbon. Pulverize a quantity of the carbon rod with a hammer, until it is no coarser than fine sugar. Wrap around the two pieces of carbon, after they are both firmly in place, a small strip of thin cotton cloth. Fill the space between the carbon blocks with the powdered carbon, retaining it in place by means of the strip of cloth, which should be bound around the carbons with a thread.

The two carbon blocks are now supported, the one at the center of the diaphragm, the other at the center of the strip at the back, with a ⅛ inch space between them, which is filled with powdered carbon. The cloth, wound around the carbons, holds the powder in place, yet it does not prevent the free vibration of the diaphragm and its attached carbon block.

Connect the front carbon with a binding post on the top of the box, and the back carbon with a second binding post, by means of the wires described. Screw the cover and its attachment to the box, and our transmitter is complete.

FIND WARM AIR ABOVE SIX MILES.

Reports on the results obtained from the ascents of 258 balloons to altitudes of 11,000 meters (37,000 feet) have been submitted to the International Aeronautical commission by Teteserrence de D. Bort of Paris. The thermometrical apparatus employed in these ascents recorded the presence of warmer atmosphere above 10,000 meters (32,500 feet), having well defined boundaries.

Privy Council Assmann of Berlin has confirmed this statement, made by M. de Bort. The former sent up rubber balloons to an altitude of 19,500 meters (63,350 feet), which traversed a warm atmospheric belt.

Count Palazzo of Rome, of the Italian division of the commission, announced that Italy will join in the commission's investigations of atmospheric conditions, and said the Italian government is erecting an observatory for this purpose on top of Monte Rosa, in the Pennino Alps.

Count Palazzo also said that this observatory will be used for experiments in the matter of curing tuberculosis by high altitudes.

"When it is great Popular Mechanics will tell about it."

$26,000,000 DEPOT FOR LEIPSIC.

The municipality of Leipsic has approved a contract of the Prussian and Saxon railroad authorities for the construction of a central railroad station at Leipsic to cost $26,000,000, of which Leipsic is to pay $4,500,000. Emperor William wished to spend $1,375,000 for the construction of a new railroad station at Homburg, but the conservatives in the Diet refused such a large appropriation for a railroad station at such a small town. Emperor William is pressing his scheme, however, and a curious scene occurred in the royal waiting room of the Homburg station a few days ago when he ordered the burgomaster of Homburg and a number of prominent citizens of the town to attend a meeting in the waiting room and hear Herr Thielen, the Prussian minister of public works, lecture on the desirability of this proposed new station at Homburg, and the architects explain their plan of the projected building.

A MILLIONAIRE AUTOMOBILE CLUB.

Six aditional leaders of finance and commerce in America were added to the list of millionaire members of the Automobile Club of America at the club's last meeting in New York. (They are H. C. Frick, J. F. O'Shaughnessey, John W. Gates, August Belmont, Alfred G. Vanderbilt and A. W. Rossiter. William K. and Reginald C. Vanderbilt were among the first to join the club. The club announced the acquisition of a large room in the Garden City hotel as club headquarters and an electrical and gasoline charging station. Several points on Long Island will be selected as sub-stations.

RUNS STEAM ENGINE WITHOUT STEAM.

Remarkable Performance of a Texas Engineer—Uses Natural Gas Instead of Steam.

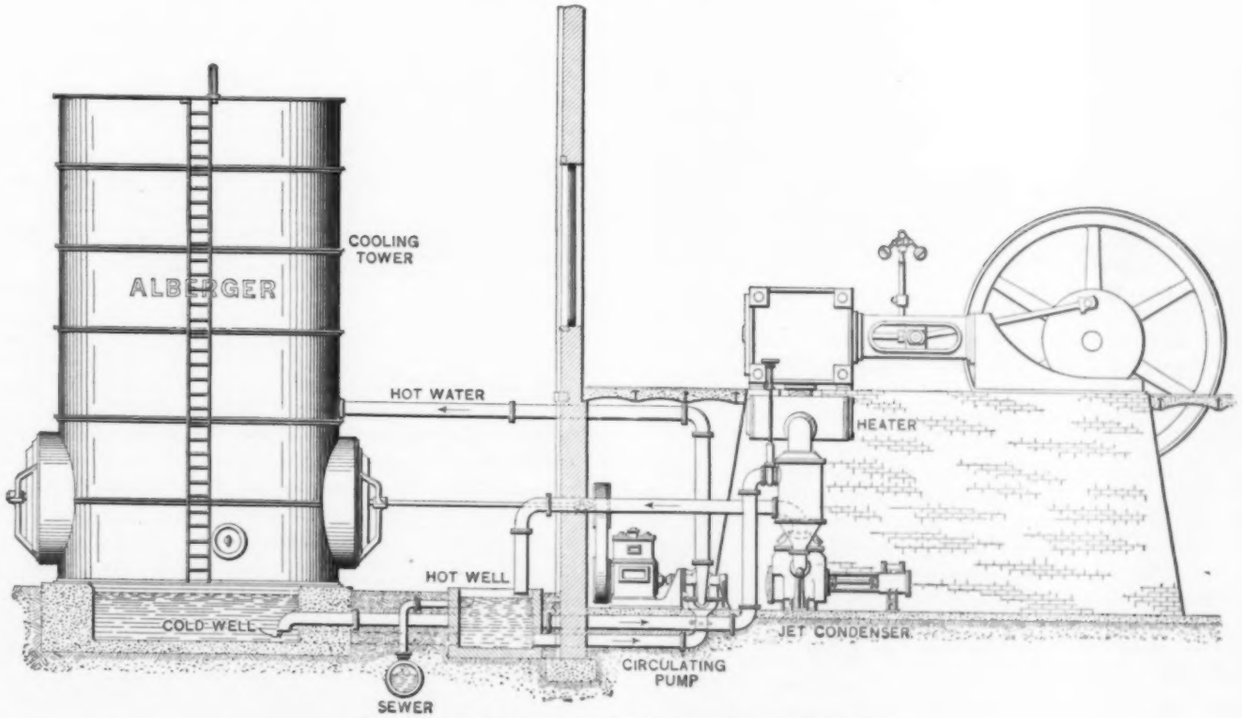
A gas phenomenon has been struck near Big Hill in Matagorda county, Texas, according to the Houston Chronicle, which says:

"At 900 feet the drillers struck a gas formation with pressure much stronger than any other well in the coast country. The drillers not knowing what to expect, had the hole torn up and lost two holes just as they struck a rock that shows from rocks blown out a formation exactly like the cap rock at Spindle Top.

"P. M. Lea of Lea & Sons, Beaumont, who is drilling the well, has made a permanent gas well out of the first well and is drilling the third well entirely with the gas power it furnishes. So great is the pressure that he has piped the gas into the boiler as a settling tank to prevent getting grit in the engine, and then connects it directly with the engine and pumps, and runs the engine with direct pressure without steam or fire, and is now down 400 feet with the third well with the gas power. The pressure is not all turned on, yet the boiler blows off all the time at 110 pounds.

"After the gas is used for power in the engine and pumps the escape pipe gives the appearance of pipes in an ice factory filled with ammonia. The ice freezes a quarter of an inch thick on the outside in contact with the atmosphere and chunks of ice form on the inside from condensation of gas and blow out when they shut off the gas sufficient to push it out."

New Cooling Tower System



Alberger Cooling Tower, Jet Condenser and Circulating Pump.

We illustrate a new system of cooling the hot water from a condensing engine. The hot water is pumped to the top of a round steel tower where it is sprayed by revolving arms and falls through wooden slats. A fan causes a constant current of air to pass upward through the tower, cooling the water. The system is known as the Alberger cooling tower.

Popular Mechanics

Published by Popular Mechanics Co.
Journal Building, - - - Chicago

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Monthly Edition..... 1 00
Advertising rates, $2 per column inch per issue.

Popular Mechanics is an illustrated weekly review of the mechanical and engineering press of the world, presented in plain, simple language, and condensed as much as possible. We always credit publications from which illustrations and facts are taken. Where the name only of such publication is given, it indicates we have used practically the entire article. Where name of publication with date of issue is printed, we have made only a brief digest, and those of our readers who desire to study all the details of the subject should procure from its publishers, or their local newsdealer, the copy of that date

Popular Mechanics is mailed in time to reach every part of the country by Saturday morning.

Make Remittances by Draft, Money Order or Registered Letter. Address,

POPULAR MECHANICS
Journal Building, - - Chicago

Entered at the Chicago Postoffice as Mail Matter of Second Class.

CONTRADICT THE NEWTON THEORY.

The Morelian theory, which contradicts and reverses the Newton theory, is gaining quite a number of adherents among scientists. Oliver M. Babcock says:

"It is gratifying that science has at last risen against the dogmatic and absurd theory of attraction as the regulating force of the universe. We have only to reverse the order from attraction to propulsion and we shall find familiarity with all the operations of nature. Newton did not discover the law of attraction, for such a law does not exist and therefore could not be discovered. Separation diminishes while approximation strengthens attraction, according to the Newton theory. If this were true then we would weigh more when close to the earth than when at an elevation. Our feet when on the ground would be heavier and walking would be more difficult than when on the floor of a high building. The earth in winter is 3,000,000 miles nearer the sun than in summer. If the sun's attraction holds it from greater separation than its orbit, how is it that it is not held at a shorter distance with a stronger pull? If the earth's orbit be circular or elliptical, we are in a situation most precarious at a very delicate poise, for the slightest variance from the sun in either direction would be fatally augmented—either from the sun by weakening of attraction or toward the sun by the increase of attraction. Whether it be momentum or outward attraction that holds the earth away from the sun, the danger would be the same.

"According to the Morelian, the propulsive or positive theory, all stars radiate force outward, sun and earth included. The nearer they approach the more they repel, the farther apart, the weaker the impulsion, while from opposite direction they are driven toward each other. So at about 90,000,000 or 95,000,000 miles apart is the line of equilibrium along which the earth oscillates, performing its annual revolution around the sun. Thus planets cannot fall onto their suns, nor collide with each other. How safe! How true! How beautiful!"

The extension of the Gould railroads to tide-water at Baltimore will cost $20,000,000. There are 15,160 miles of road now controlled by Gould, and the Gould lines will soon exceed in mileage the Vanderbilt, Pennsylvania and Harriman systems combined.

WHERE THE SWEETEST ORANGES GROW.

Work of Assorting Oranges in the New Region of Northern California.

Assorting oranges into the various marketable sizes is one of the principal jobs in the orange shipping industry. During the orange season in California such scenes as are illustrated in the accompanying cut are familiar sights on all the orange plantations, large and small. The present methods of assortment are the acme of simplicity and convenience.

The oranges are poured into the receiver or hopper and permitted to roll into the separator. This is a kind of long trough, narrow at the end where the oranges enter and wide at the other end. In the center of this trough is a roller of equal length which continually revolves, keeping the oranges in motion. All sizes of oranges enter the top or narrow end of this separator together. Whenever an orange comes to a part of the trough wide enough to permit it to make its exit it drops out and falls into a bin below provided for its reception. Thus the smallest drop out first and the largest last and all oranges of the same size drop out at exactly the same place along the length of the trough or separator. They are divided into sizes of from 80 to 288 to a box.

This Machine Sorts Oranges.

The picture shown in the illustration was taken on the orange ranch of Bates and Bolt in Butte county, Northern California, where the earliest and sweetest oranges grow. It is from this section that we get our oranges for Christmas. Not many years ago it was contended that oranges would not grow so far north, but those who risked their money on the experiment are now being generously repaid, for not only do oranges grow here to splendid size but they are of superior flavor and the entire crop is marketed before Christmas while the oranges of Southern California are hanging green on the trees.

"In a mining region," says Dr. Edmund O. Hovey of the United States Geological Survey, "one often hears ores spoken of as running 90 per cent lead, 80 per cent zinc, etc., when the purest crystallized minerals do not contain such amounts of the metals."

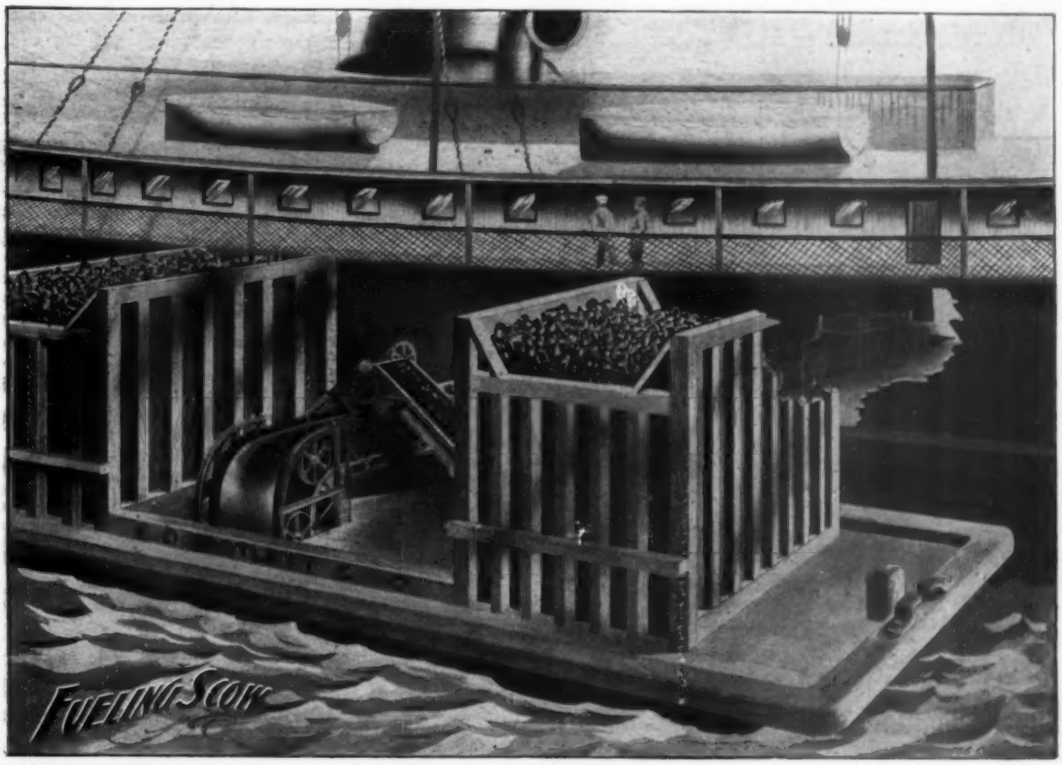
The atmosphere which was formerly believed to extend but 60 miles above the earth is now believed to be at least 500 miles high. The contention is based on the amount of atmospheric friction necessary to ignite meteors, many of which have been observed to flash at a height of 100 miles.

NOVEL DEVICE FOR COALING VESSELS.

The Coaling Scow, a New Invention, Is a Boon to the Mariner.

Coaling of vessels which for many years has been the terror of the mariner is fast losing its objectionable features by late inventions. The latest of these is the fueling scow, shown in the accompanying illustration. The Scientific American thus describes its mechanism:

Near each end of the scow are located two large coal-bins, from each of which an elevator carries the coal and delivers it to a belt conveyor mounted in the center of the scow. The elevator is so arranged that it may be driven in either direction, thus carrying coal from either bin as may be desired. The belt conveyor by which the coal is delivered from the scow into the different hatches of the boat is so arranged that it can be carried



A New Means of Coaling Vessels.

on the scow when not in operation. When it is desired to fuel the boat, the scow is moored fast, and, by mechanical devices, the delivery end of the belt conveyor is raised or lowered until it is on a level with the deck of the boat, and rests on the deck by means of two shoes. An engine located on the delivery end is used not only for driving the belt conveyor when it is carrying coal, but also for running the belt conveyor out onto the deck of the boat and returning the conveyor to the scow again.

This conveyor is so arranged that it does not matter to what distance it is run out on the deck of the boat. The belt will always remain tight and can be used in any position. After the boat has been coaled, the engine is reversed and the conveyor is backed to the fuel scow in position to be transported to some other boat. On the rear of the scow is located the boiler with the necessary driving engines. An auxiliary engine operates the elevators leading from the bins. Both elevators and conveyors are large enough to handle any kind of coal, even large lump coal as it comes from the mine.

OLDEST BLACKSMITH IN AMERICA.

Samuel Brock, of Falmouth, Grant County, Ky., is the oldest blacksmith in America who is still working at the trade, according to a thorough research of the continent recently made by the American Blacksmith. Mr. Brock is 95 years old and yet works at the forge every day. He is the son of centenarians. His father lived to the age of 113 years and his mother was 106 years old when she died. He has been a blacksmith for 76 years. He was born in Virginia and is a Democrat. Mr. Brock seems to possess exceptional vigor and says he can yet put a shoe on a mule.

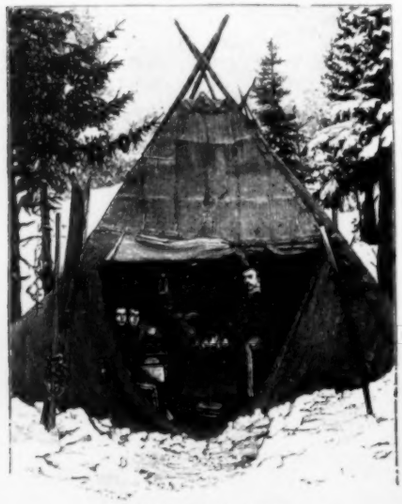
Other aged blacksmiths who are still engaged in active work are: Joe Bragg Turner, of Warsaw, N. Y., and Mr. Hyatt, of Lake Charles, Ia., each 92 years old; Thomas Downs of Patesville, Ky., 86 years old; William Tubbs, of 271 Washington street, Norwich, Conn., 85 years old; W. H. Richard, Monongahela, Pa., 85; Walter, Stickney, Meriden, Conn., 85; Albert Avery Hartwick, Otsego Co., N. Y., 84 years old; Daniel Gorman, Lima, O., 84; Daniel Bidwell, Cute, Tenn., 83; John S. Edwards, Leeds, N. Y., 82; Nathan Mosley, Limestone, Tenn., 82; Frank Miller, Potosi, Mo., 81; Stephen H. Abes, Esperence, N. Y., 80; L. D. Krum, Krum's Corners, N. Y., 80; S. D. Bolander, Allentown, O., 80; G. W. M. Drake, Monticello, Minn., 80; H. W. Dodge, Stromness, Ont., 80; James E. Marcum, Troy, Kan., 80.

Prof. William T. Sedgwick, of the Massachusetts Institute of Technology, says that sewers are free from bacteria; that there is little danger in gases from drains, sewers and cesspools; he repudiates the noxious effects of bad smells; he denies the unwholesomenes of damp cellars; says old water is healthier than fresh water and in fact knocks to pieces all our time honored scientific theories.

Popular Mechanics is "written so you can understand it."

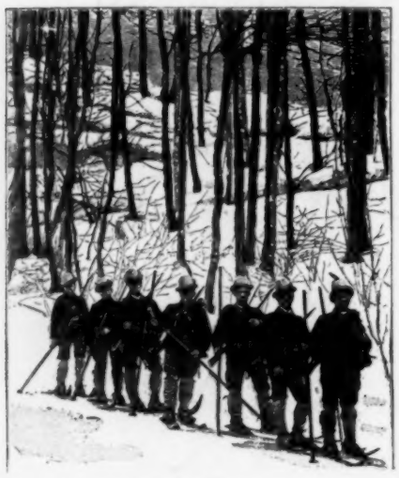
AN ARMY ON SNOW SHOES.

An army on stilts would make better progress these days in this latitude than on snow shoes, as seen in our illustration. In Norway, however, the winters are long



Tent Life in Winter.

and the snow deep, and the soldiers are taught to make long journeys and rapid maneuvers on the snow. So expert do they become that very rapid movements of large bodies of infantry are possible. When on one of these expeditions the soldiers carry the full regulation marching equipment, including blanket, musket, canteen and a day's rations, and in addition an Alpine



Scouting Party.

stock to help them up steep places. To the beginner the exercise is very severe, but after he has once mastered the art of working the shoes, the trip is much easier than marching on foot. When the troops reach a long slope they dash down like a flock of birds presenting an exciting scene. Notwithstanding the cold weather, and the exposure of sleeping in tents with the thermometer below zero, the men seem to enjoy the winter service and find it more interesting than the summer marches over dusty roads in hot weather.

AVOID EXTREMES IN MIXING CONCRETE.

In a discussion on the subject of wet and dry concrete, Mr. T. M. Ripley, speaking of concrete foundation work, says that either extreme should be avoided. In a paper printed in the Journal of the Association of Engineering Societies, Mr. Ripley states:

"In the laboratory the ingredients can be dried, and the water measured and added portion for portion; but on construction this is seldom possible and rarely practical.

"Frequently we get wet and dry both on the same day from the boats. A sand or gravel pile rained on tonight will not require the same amount of water added for the mixing as it would today. I have seen batches, made from the same piles of gravel and sand, vary from a moderately dry to a sloppy mess, when using equal amounts of water; because in the former case the ingredients happened to come from the tops of the piles, and in the latter from the bottoms of the piles where the frost was yet in evidence. (We were using hot water). No two piles of sand will absorb the same amount of moisture unless seasoned for a length of time according to climate conditions.

"Concrete, when too dry, sets in layers, and in extreme cases is granular and of no account, resembling concrete poor in cement. Concrete too wet may float the cement; but the greatest loss is usually due to inability to handle it owing to its semi-fluid condition.

"The locomotive has lengthened a man's stride till now he can outstrip the wind."

A Detachment of Norwegian Troops.

PRETTY, HUSTLING VICTORIA, B. C.

Victoria, B. C., has issued a handsome illustrated souvenir (a copy of which we have received) in commemoration of its recent "Victoria Day Celebration." This is one of the most thriving and enterprising towns in the Dominion and is surrounded by resorts and scenery that have few peers in attractiveness.

ROAD THAT COST $40,000 A MILE.

The wonderful toll road from Ironton to Ouray, Col., is one of the greatest attractions in that state of marvels, both of scenery and engineering. The old fashioned stage, with all its romantic associations, is rapidly becoming a thing of the past. Hence it is a novel experience to climb into a Concord coach and for three hours to ride along a magnificently constructed road, hewn out from the side of mountains at an expense of $40,000 a mile, gazing into the depths of the canyon below, 1,200 feet, or looking forward to range upon range of frowning mountains. In no part of the world, says the Canadian Engineer, can such magnificence of scenery be compressed into a three hours' ride.

The American School of Correspondence, Boston, has arranged with the Armour Institute, Chicago, whereby Dr. Gunsaulus, president of Armour, becomes chairman of the advisory board of the American School, and students of the correspondence school will receive credit toward a degree when entering Armour.

Chinese make their spades from British horseshoes. Shiploads of old horseshoes are sent from England to China every year. Thousands of these spades are shipped back to London.

HIGHEST PRICE EVER PAID FOR ONE HORSE SHOE.

Robert Collyer, the divine who left his forge to go to the pulpit, was probably paid the record price for making a horse-shoe. He said:

"This was soon after the great fire in Chicago in 1871, when the students of the Cornell University offered me a thousand dollars if I would make them a horse-shoe; so the shoe was duly made, the money paid promptly down on the nail, and I stood ready to make a hundred on the same terms."

FULL MASTED WHEN LAUNCHED.

It has been decided to rig the seven-masted schooner Thomas W. Lawson before she is launched. As each of her steel masts weighs 17 tons without rigging and 20 tons when completely fitted she will have a somewhat unusual weight aloft for launching and special preparations are being made for getting her into the water.

SUMMER SCHOOL FOR ARTISANS.

The Summer School for Artisans, at Madison, Wis., the only institution of its kind in the country, is to open with the regular courses this summer. The school is a branch of the University of Wisconsin and was inaugurated last summer. Any person over sixteen years of age, speaking the English language and having a fair knowledge of arithmetic will be admitted. The tuition fee for the term is $15 for all courses, in addition to which are laboratory fees of five cents per hour for all time spent in such practical work. The courses include the Use of Formulas, Mechanical Drawing, Steam Engineering, Shop Work in Carpentry, Applied Electricity, Transmission of Power, Strength of Materials, Forging and Machine Tools.

STORE THAT WILL NOT MISREPRESENT GOODS.

At this time when America is gaining an unenviable reputation from the many adulterations in food and clothing, it is gratifying to know that there are some merchants who strive to protect the public from such impositions. These many frauds have been mentioned in Popular Mechanics as they are detected. In Chicago Hillman's department store has started a movement to give to the purchaser genuine goods—exactly what they are represented to be—at reasonable prices. The store has met with such wonderful success that others have been forced to fall in line and the day may not be far away when the American citizen may know what he is buying.

The diameter of the steam supply pipe should be about one-fourth the diameter of the piston.

NOT A PARTICLE OF WOOD IN THIS RAILROAD.

Concrete Ties, Long in Use in Prussia, Are Becoming More Popular.

Another blow at the use of wood in mechanical construction is delivered in the manufacture of armored concrete ties for railroads, which is growing in popularity. In a recent issue Popular Mechanics told of how wood was fastly sinking into disuse as the forests were thinned; how bridges, piling and numerous other structures and appliances formerly of wood were now made of concrete and other substances; of how in the most modern commercial buildings little or no wood enter into their construction.

Track Made of Concrete and Iron.—(From Cement News.)

Here we illustrate a railroad which has not a piece of wood about it. It is a track of the Prussian State Railways, near Briessen. The Railway Review in speaking of this road says:

"The rail fastening consists of an automatic locking device in which the grip between the clip and the rail is increased with the weight of the train. This particular section of track has been in service since Sept. 28, 1897, and the ties which consist of concrete with embedded iron parts are used on both side tracks and on main line under heavy traffic. It is said that during five years of traffic the ties have not deteriorated."

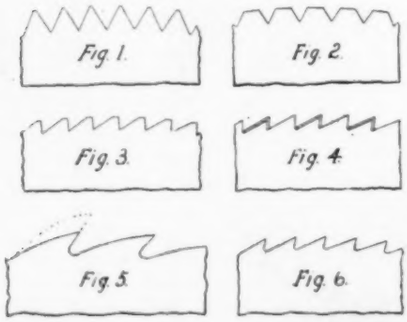
CUBA'S TELEGRAPH SERVICE GREATLY IMPROVED.

Less than 1,000 miles of very poor telegraph lines were all that Cuba could boast of when the United States army occupied Havana. The signal corps, which reconstructed the system, recently turned over to the Cuban Republic 3,500 miles of telegraph lines of the best quality and construction. The new system has added $100,000 to the treasury and has transmitted free official business which would have cost $250,000 if paid for at the regular rate.

SHOP NOTES

FITTING CIRCULAR SAW TEETH.

A writer in the Wood Worker gives his experience in filing the teeth of a circular saw, which was a new one with teeth of the usual shape. Fig. 1. I wanted to use an emery wheel for my limited experience had been confined to ordinary filers' common work, and I proceeded to file, maintaining the shape pretty much as I found it, but of course, put on a bevel. The foreman put in an appearance after I



had filed about a dozen teeth, and made several vigorous remarks about my "pernicious activity," spoiling the saw, etc. Under his directions I went ahead again as follows: The first proceeding was to reduce the teeth to a shape about like Fig. 2, by either rasing or filing. By filing it was preferable to make them like Fig. 3, all teeth being filed square across, and level. After they had all been reduced to a general resemblance to Fig. 3, the saw was placed on the mandrel and carefully rased off with an oil-stone, hard brick, or piece of emery wheel. When every point touched, the filing proceeded, the file being held only a trifle lower on the handle end, and pitched back until the teeth showed like Fig. 4. The bevel in most of the saws was very slight, and the front side of the teeth nearly perpendicular with the radial lines of the saw. These saws cut fast, did not "howl," and when properly set made a surface nearly like a block plane.

After I had succeeded in demonstrating my ability to make saws go his way, I still maintained I could make a rip saw go fully as well, and with less expenditure of time, by grinding instead of filing. One day, somewhat to my surprise, they brought me in a bevel-edge emery wheel. I had a new 12-inch saw, with teeth about ¾-inch apart, which had never been filed. I straightway and with much glee proceeded to fix it up on the wheel. I had a lot of sawing to do in 2-inch pine, making small slabs about 3-16 inch thick, and it was necessary that they should be very smooth on both sides. In most cases they looked as if finished with a wide smoothing-plane. I also won out in an argument to the effect that the number of teeth in a saw was of importance mainly in the point of speed of cut. That is, it is not essential that teeth should be very close together in order to do smooth work. For instance, in ripping, teeth like Fig. 5 will do as smooth work as Fig. 6. For speed, however, the coarser the teeth, and the more gullet, the faster the stock can be crowded against the saw, the cut, of course, being pretty rough. A shallow, stiff tooth, nicely set, will cut as well as a planer saw, and much easier, according to my experience.

BUSHING FOR LOOSE PULLEYS.

A writer in Machinery tells how he fixed some loose pulleys which had a habit of getting tight on the shaft. He says:

The failure of the self-oiling pulleys is caused mainly by the action of centrifugal force which forces the oil into the outer portion of the oil chamber, away from the shaft, thus preventing the bushing from

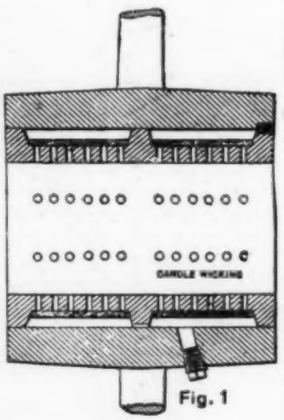


Fig. 1

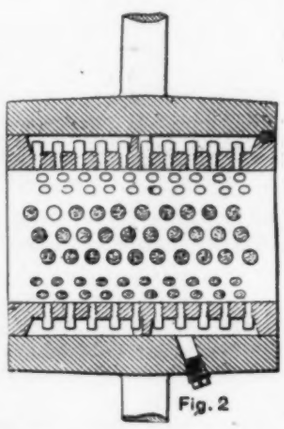


Fig. 2

accomplishing its purpose. This leaves the shaft dry and causes the pulley to cut and set fast on the shaft. The loose pulleys in our wood-working department were continually giving us annoyance in this way and I was led to put together a few facts with a view to remedying the trouble. These facts were: First, that hard wood will wear exceedingly well when thoroughly oiled and at the same time has a very slight tendency to wear the shaft; second, that some hard woods are very porous, and oil could be supplied to the shaft through the pores if the bearing was on the grain end of the wood. I have often seen how porous wood is by dipping one end of a block six or eight inches long into a dish of water and, after removing it from the water, blowing on the other end. Air bubbles at once appeared on the wet end, showing that my breath had passed through the block. With these facts in mind I constructed the bushing shown in Fig. 2.

It is similar to that shown in Fig. 1, but instead of being drilled with a number of rows of holes for the oil to pass through, I had, in the first bush of this kind (which happened to be a good-sized one), about forty holes drilled staggering to insure contact of the wood on nearly all parts of the shaft, except about ½ inch on each side end of the bush, as shown in the sketch. All holes were tapped 7-16 inch and a white ash plug was screwed in each one far enough to allow filing off on the inside to insure a good bearing of the plugs on the shaft. Although I had some doubts of this bushing being a complete success, I had it placed in the hub and the oil chamber filled, then placed it in the light where I could oberve its action. In about fifteen minutes every plug was saturated with oil; on some plugs there could be seen a drop of the oil, which indicated a success. The pulley was then put in place.

The next morning, after it had been running for about an hour, it was stopped and found to be somewhat heated—not so much, though, but that I could put my hand on it, and in a few days all heating had disappeared. I think the heating at the start was caused by the plugs fitting too tightly on the shaft. After running about eighteen months I examined the pulley and found it to be in first-class condition. The shaft was smooth as glass and the wear was slight. After this it was found to be a success.

THE ANGLE OF SCREW THREADS.

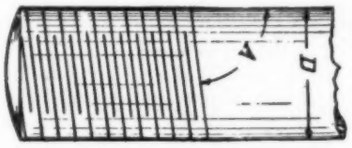
It is interesting to know just what angle the thread of a bolt would be when drawn in on a drawing as shown in the illustration.

The average draftsman shifts his tee square to bring his triangle about right and draws in the lines by sight and often has a bad looking angle, says the Draftsman, too steep for practical purposes.

After some figuring it was found that A for 1 inch to 5 inches inclusive did not

vary enough to make any material difference in the looks of the drawing.

The angle for 1 inch diameter and 8 threads being 86 degrees 30 minutes, and for 5-inch and 2½ threads being 87 de-

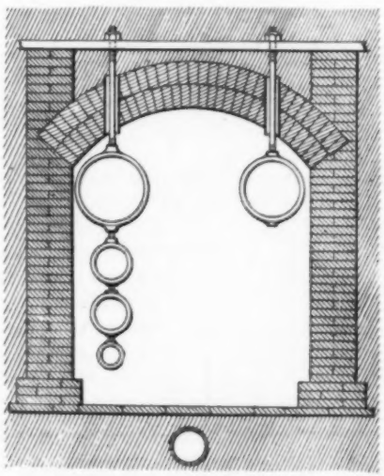


grees 40 minutes, and 6-inch diameter gave an angle of only about 87 degrees 50 minutes. The average for 1 inch to 6 inches inclusive being about 87 degrees.

On ¼-inch diameter and 20 threads an angle of 84 degrees 20 minutes, and on ¾-inch diameter and 10 threads per inch an angle of 86 degrees 15 minutes shows a slighter difference than on the larger sizes, making an average of 85 degrees 22 minutes on the smaller sizes.

HANGING PIPES IN TUNNELS.

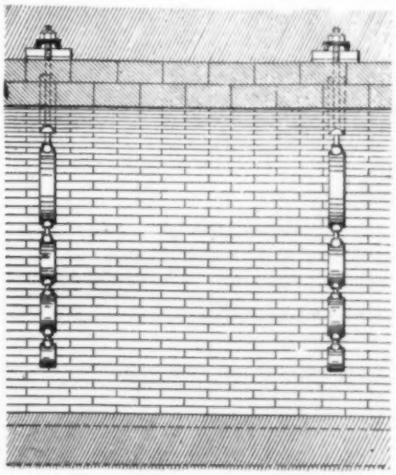
The ideal method of laying steam pipes in the ground is to place them in properly constructed tunnels, where they are easily reached in case of repairs. Such a tunnel



End View of Tunnel.

four feet high by four feet wide, constructed of hard burned brick laid in lime mortar containing one-tenth part cement will last for years. At points ten feet apart on each side a pier is constructed, resting wholly upon these side walls, and forming a bearing for a channel iron as shown in the cut. A hole 1 inch in diameter is punched in these channels 18 inches from each end, through which a rod or piece of small pipe is placed, having a long thread and a heavy nut for adustment before the earth is filled in on the top of the arch. This rod or pipe extends into the tunnel through a short piece of 3-inch gas pipe firmly imbedded in the arch in an upright position, and connects with rings slipped over the steam piping as shown.

It is sometimes necessary to hang two pipes in a tunnel or three or four perhaps,



Side View of Tunnel.

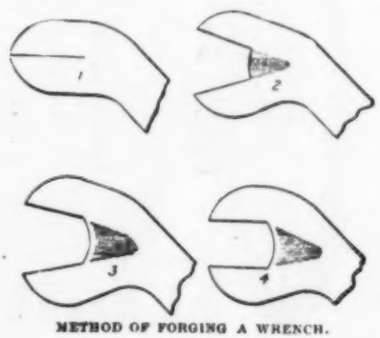
possibly six or eight; this may be easily done if care is exercised when installing the first one, to place two rings over the pipe at each point to be hung with the opening of one ring down to connect with a duplicate on the pipe below. This system is described in The Engineer.

NATURE STRONGER THAN DYNAMITE.

A remarkable quarrying feat was accomplished at Aberdeen, Scotland, last winter. A large stone had been drilled ready for splitting, when the thought struck the foreman that nature might aid in the object to be attained, the idea being suggested by the severe frost which prevailed. Water was poured into each of the drill holes, and, it being Saturday afternoon, work was suspended until Monday morning when it was found that the block of granite had completely burst open. An idea of the immense power of the frost will be gathered when it is stated that the stone thus detached measures 12 feet by 5 feet and has a weight of about six tons.

QUICK AND EASY WAY TO FORGE A WRENCH.

A simple and expeditious method of forging a wrench is described herewith.



METHOD OF FORGING A WRENCH.

A ¾-inch wrench of medium weight is mentioned for the sake of convenience. Take a piece of steel ½ by 1⅛ inches, says B. E. Pease in the American Blacksmith, bend to shape and round the corners, then split, as in Fig. 1, back ¾ of an inch. Next take ⅜-inch fuller (if you do not have one at hand use a ⅜-inch round iron) and fuller in a little to spread the jaws. Fuller on one side only. Then with a ¾-inch fuller spread the jaws wider, as in Fig. 2. Next drive the fuller in between the jaws until they are spread the right width, Fig. 3. Then turn the jaws and forge the handle to suit the work required.

LOSS FROM CONDENSATION OF STEAM IN PIPES.

Some experiments recently made by Mr. G. H. Barrus at the Manhattan Railway power station, London, showed that in a 2-inch steam pipe 100 feet long, and under 80 pounds pressure, the condensation amounted to 60.3 pounds of steam per hour when the pipe was bare, and to 15.14 pounds per hour when covered. With steam at 100 pounds pressure, says the Electrical Review, the condensation, when uncovered, reached 72.20 pounds per hour. In a 10-inch pipe 35 feet long, carrying steam at 100 pounds' pressure, the condensation, when uncovered, amounted to 112 pounds per hour, and when covered to but 15.93 pounds per hour. The temperature of the surrounding air ranged during the experiments from 50 degrees to 75 degrees Fahrenheit.

WAVES MADE BY SHIPS.

What resists the passage of a ship rapidly through the water? says the London Telegraph. Most people would reply "the necessity of pushing aside an amount of water equal to the size of the hull below the surface." Dr. Fleming, who has studied the matter, says not; that the resistance is chiefly due to the "stickiness" of the water and the waves the ship pushes up in front. Of course such liquids as tar or molasses present a greater degree of this, but water also has what is called the skin friction of ships. On torpedo boats at 10 miles an hour 80 per cent of the entire resistance arises from this water friction; but at full speed this is only 43 per cent, the other 57 per cent resulting from the huge waves thrown up in front. The shape and covering of fishes is such as to excite the least resistance. A photograph of the Viper at 43 miles an hour showed the bow actually lifted out of the water while the boat herself seemed to be resting on her bow wave. It is the steam power required to drive these huge waves that caused the Deutschland to burn 2,500 tons of coal in her five and one-half-days' trip across the Atlantic.

PATENTS

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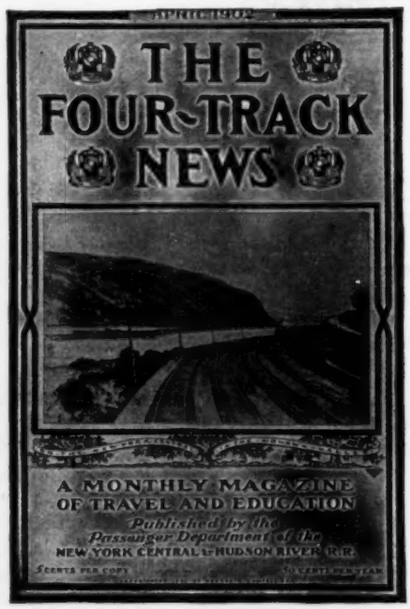
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The Hardwood Manufacturers' Association has voted to advance the price of hardwood lumber $1 per thousand.

WORKS AN ELEPHANT ON HIS FARM.

James Camil of Roney's Point, W. Va., uses an elephant in working his farm and hauling logs. So satisfactory is the result that he says if other farmers would use elephants instead of so many horses the huge beasts would soon come into general use in America. The elephant, he claims, can do the work of six horses. It is docile at all times and seems fond of work.

DECAYED DOMESTICITY.

Houses are gone; in flats one dwells,
  Flats higher than St. Paul his dome.
The orchestras of new hotels
  Drown the old strain of "Home Sweet Home."

Only the nurse by baby stays,
  Only the club our food can dress;
We from a cookless kitchen gaze
  Upon a nursery motherless.

Reckless, the modern woman throws
  Her high prerogative away;
Forth to the market place she goes,
  And does man's work—for woman's pay.

Yet if some palliation's sought
  For woman's error—nay, her crime—
There is at least the simple thought,
  This has been going on some time.

Domestic arts whose loss we grieve
  Have been decaying every year
Since Adam first observed to Eve,
  "Your cooking's not like mother's dear."
—London Daily Chronicle.

An engineering contemporary says that the best way to harden a steel tool for a special purpose is to heat it to a cherry red, drive the point into a cake of lead, and leave it there until it is cold, when it will be found to be hard and tough.

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NOSE CUP THE LATEST.

Did you ever see a nose cup? It is the very latest addition to the toilet and some doctors say it is as necessary as a tooth brush. In large cities where the air is full

of smoke and dust ladened germs, the nostrils become filled with dirt. Then you fill the nose cup with warm water, insert your nose in the cup and snuff up the water. When the water runs out it removes all dirt from the nostrils.

SAYS RAILWAYS AID IN SMUGGLING CHINAMEN.

By Chairman Shattuc of the House Committee on Immigration.

The immigration laws of this country are flagrantly violated. Canadian steamship agencies in Europe do not hesitate to advocate openly and guarantee to their passengers (the good, bad and indifferent ones) that they shall be safely delivered into the United States and no questions asked if they will only take passage via Canada. I have their bills so advertising.

This is not all. It can be proven that one of the Canadian railways is in the Chinese passenger traffic regularly, and is assisting the smugglers by stopping its passenger trains several miles outside of a certain city and discharging the Chinese in the country, where wagons built especially for the purpose, take whole gangs over the border under cover of the night and in this way thousands of Chinese enter the United States annually.

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The Dividend Oil Company
Of Beaumont, Texas
Capital Stock, $125,000 Treasury Reserve $50,000
ONE-CENT SHARES
The Dividend Oil Company has made most remarkable progress since its organization. None of its stock was offered to the public until the company was earning money. The desire of the management was to offer the investor something more substantial than promises.
The Investor has begun to realize that one share of stock in a company capitalized at $100,000 is equal to ten shares of stock in a company capitalized at $1,000,000, provided the stock be of the same par value.
The Dividend Oil Co. owns its land on Spindle Top in fee simple, on which it has one well of 50,000 barrels capacity.
The Dividend Company has land for three additional wells, which will be drilled as soon as the market demands.
The Dividend Company owns 2,000 acres leasehold in the Louisiana oil fields.
The Company owns, in addition, 2,000 acres leasehold in the Texas oil fields, where important developments are taking place.
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The Dividend Company has **seventeen** tank cars for individual shipment, which renders it independent of the demands which might be made on the railroads.
A DIVIDEND PAYER
As the name of the company indicates, it is a dividend payer, and shows a most remarkable record. Actual shipments of oil by the company has been going on for some time, and it is shipping from **five** to **ten** cars per day.
The DIVIDEND COMPANY
Has sold the major portion of its output to the Sun Oil Company, one of the biggest oil corporations in the world.
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OUR WEEKLY MARKET LETTER ON BEAUMONT STOCKS FURNISHED ON APPLICATION.

Hair or moss do not afford good material through which to strain color. Cheese cloth at 3 cents per yard is cheap, and gives clean color. Varnish can be used to the very bottom of the can by straining. In fact, nearly all first-class body finishers insist upon straining all their varnish.

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I desire to represent a manufacturer as Selling Agent, Mechanical Line preferred. On commission basis. References exchanged. Correspondence solicited. Address
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IF YOU WANT a machine, tool, or anything in a mechanical line and don't know where to get it, write Popular Mechanics.

Attractions for July 4th.

Did you know that the American flag is 100 years older than the flags of Germany and Italy and older than the flags of Great Britain, France and Spain? If not you ought to read about it in the Fourth of July issue of Popular Mechanics. It will tell all about our flag, how it came into existence, etc. There is not a boy in America who will not suffer a great privation if he fails to get this Fourth of July issue. Nothing like it was ever published before. It will not be smeared over with red and yellow paint, but it will tell you how to do things on the Fourth of July just as the regular issue of Popular Mechanics tell you how to do things in general. There will be an article on how to make a volcano, how to make a Fourth of July Cannon; how to make several other different kinds of fire works; where fire crackers come from; how they are made in China; how to make a Fourth of July kite; how to make a match cannon; how to fire fire-works of all kinds and many other articles of interest to every person who cares to know about the whys, hows and wherefores of things. The Fourth of July issue will appear June 28. It will contain the usual run on instructions to boys on electrical works, wood and iron work and how to make them, with other mechanical articles of unusual interest. The next issue will contain about 50 articles on the most interesting mechanical events of the day. Order of your newsdealer early.

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